

POLLY POSSUM'S MATH FARM

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Our ever changing world becomes more technical each year. It is imperative that today's children have a solid background in math and science if they are to keep abreast of these changes. It will take highly specialized skills to analyze and resolve the intricate environmental problems facing our planet, to expand our knowledge through space exploration and to combat diseases like AIDS. It is our responsibility to prepare our children for these challenges. With these thoughts in mind, the Park District of Dayton-Montgomery County developed the goal of providing a hands-on learning experience in math that would be challenging, but most of all fun. Polly Possum's Math Farm was thus created, funded by a grant under Title II of the Education for Economic Security Act of 1984, administered by the Ohio Board of Regents.

Possum Creek Farm is owned and operated by the Park District of Dayton-Montgomery County. It is a 100-acre educational farm where the public can participate in farm tours, special programs, free public gardens and volunteer opportunities. The farm is a tranquil place that offers a barn full of animals, a chicken house, a rabbit shed, an apple orchard, bee hives, hiking trails, a bird blind and herb gardens. In this setting, children are introduced to a cartoon character Polly Possum, and her Math Farm.

Upon arrival, groups (Kindergarten-12th grade) are invited into the farmhouse meeting room for a brief orientation and a slide show that demonstrates the many uses of numbers. Visitors may then work at their own pace as they stop at each of 15 stations set up throughout the farm. Each station has a different agricultural topic and is equipped with a 30" X 36" fiber-imbedded sign and any necessary student props. Background information is given about each topic and then there are three related story problems that increase in degree of difficulty, most requiring hands-on activities to solve. For example, at "Size of an Acre", younger children run around four posts marking off an acre to get a real idea of how big an acre is. Second level students measure the width of our plow to determine how many times a farmer must go back and forth to plow the acre. Third level students determine the area of the acre in square feet. At "Grain and Livestock" the children

are told that a horse eats one scoop of grain twice a day. First level students must scoop enough grain from the bin to feed a horse for two days. Second level students must scoop enough grain from the bin to feed a horse for one week. Third level students must determine how many cubic inches of grain it would take to fill the bin.

Polly Possum, a Disney-like hostess, is featured in the slide show, at each of the 15 stations and on brochures. A stuffed-animal version is in the meeting room and she is also painted on the front of the farmhouse.

It is our hope that Polly Possum's Math Farm will make numbers a little more appealing and will help to enhance basic math skills, which are an important foundation for higher education. It is also our hope that similar programs will be started in other areas so that more children may benefit. If you are interested in more detailed information about the project or perhaps in starting a fun new math program, please write to us for information. We'll be happy to send you a packet containing brochures and resource names and numbers. You're welcome to duplicate our program or adapt it to suit your needs. We'd love to share some ideas!

1 The Apple Orchard

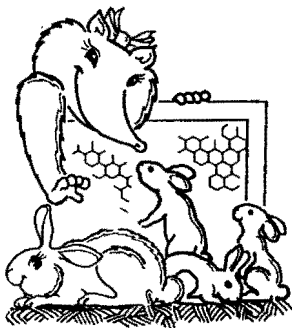
Apples have been eaten by people for at least 1 million years. Today they are one of the most important fruits grown on trees and one of the most popular. They are eaten raw as well as used in many food products.

- ☐ Count how many trees are in the orchard. Are there enough trees in the orchard for everyone in your group to have "their own" tree?
- ☐ It takes two pounds of apples to bake a pie. The average tree bears 450 pounds of fruit. How many pies can be made from the fruit of one tree? ($450 \div 2 = 225$ pies)
- ☐ Count the trees in the orchard and figure out how many pies could be made if two pounds of fruit equals one pie, and each tree bears 450 pounds of fruit. (count trees, multiply by 450, divide by 2)



2 Rabbits

Rabbits are raised for both meat and fur. A female rabbit (doe) can give birth to as many as 40 young in a year. Baby rabbits are born furless and with their eyes closed.



☐ Bunnies open their eyes when they are 10 or 11 days old. Is this more or less than a week? (more than)

☐ Rabbits are weaned (depend on food other than their mother's milk) at eight weeks of age. How many days is this? ($8 \times 7 = 56$ days)

☐ An average fryer (rabbit) weighs three pounds. If a farmer's family eats 192 pounds of rabbit per year, how many rabbits must be raised to feed the family? ($192 \div 3 = 64$ rabbits)

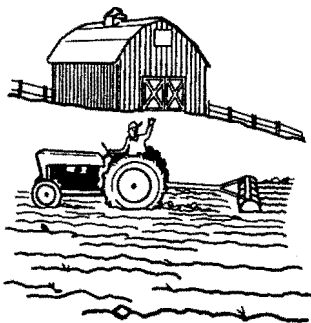
3 Size of an Acre

An acre is a measurement of land. It's essential for a farmer to know the acreage in order to buy seed or fertilizer, calculate the harvest, pasture livestock, or plan other land uses.

☐ Have someone time you as you go around the marked off area of land. This is an acre.

☐ This acre is 120 feet wide. Measure the farmer's plow and determine how many times the farmer will need to go back and forth to plow the acre of land. (120 divided by the width of the plow)

☐ This acre is 120 feet wide and 363 feet long. What is the area of an acre? ($120 \times 363 = 43,560$ square feet)



4 Grain and Livestock



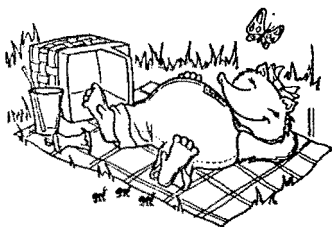
Animals need to eat a balanced diet just like people. Most livestock need corn and oats with vitamins and minerals added. They also need to eat either grass or hay.

- ☐ A horse eats one scoop of grain twice a day. Scoop out enough grain to feed a horse for two days. ($2 + 2 = 4$ scoops)
- ☐ A horse eats one scoop of grain twice a day. How much grain would a horse eat in one week? ($2 \times 7 = 14$ scoops)
- ☐ The grain bin is partially full. Measure and calculate how many more cubic inches it will hold. (volume = length x width x height)

5 Food and Nutrition

Good nutrition is essential for health. The key to good nutrition is a varied diet that includes foods from the four basic food groups: Milk group, meat group, bread-cereal group and fruit-vegetable group.

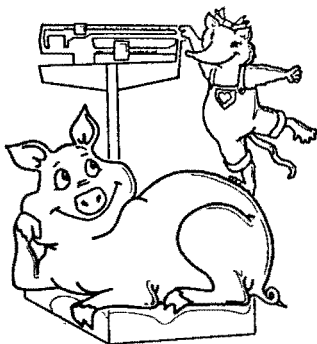
Polly Possum had a picnic lunch. She had: a fried chicken leg (89 calories), a glass of milk (159 calories), two slices of bread (124 calories), an apple (80 calories), and an ear of corn (71 calories).



- ☐ Does Polly have an item from all four food groups? Which food item had the most calories? (yes; milk)
- ☐ How many calories did Polly consume? ($89 + 159 + 124 + 80 + 71 = 523$ calories)
- ☐ If Polly is supposed to eat 1600 calories per day, how many more calories can she have today? ($1600 - 523 = 1077$ calories)

6 Raising Hogs

About $\frac{1}{4}$ of the meat eaten in the United States comes from hogs. They provide pork which is eaten as pork chops, ham, bacon and sausage. Other parts of a hog are used to make lard, leather, brush bristles, soap, fertilizer, glue, medicines and many other products.



- ☐ Using the large scale, about how many students are needed to equal 230 pounds, the market weight of a hog?
- ☐ An average piglet weighs two pounds when born and 230 pounds when it goes to market. How much weight must the piglet gain to reach market weight? ($230 - 2 = 228$ pounds)
- ☐ A piglet born April 3 will go to market October 2. How many days old will it be then? How many weeks is this? How many months? (182 days; 26 weeks; 6 months)

7 Sheep and Wool

Sheep are among the most important animals that people have tamed. They provide wool for clothing, as well as meat, called mutton and lamb. In some countries, their milk is also used. In addition, sheep are used in the making of glue, tallow, suet, soap, fertilizer and cosmetics. Lanolin, a common ingredient in hand lotions, comes from sheep's wool.

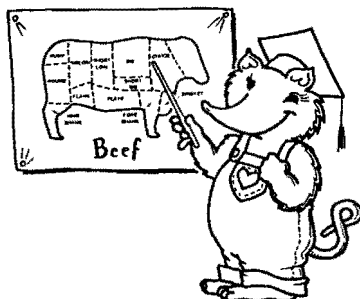
- ☐ Weigh the fleece on the scale. This is the amount of wool a sheep gives per year.
- ☐ About 17 million lambs are born each year in the United States. Write the number 17 million. (17,000,000)



- ☐ If one sheep gives about 8.5 pounds of wool per year, how many pounds of wool would 20 sheep provide in one year? ($8.5 \times 20 = 170$ pounds)

8 Beef Cattle

Beef is the meat from mature cattle. People in the United States eat more beef than any other meat — an average of 104 pounds per person annually.



- ☐ A calf born today will take 18 months to reach market weight. Is this more or less than a year? (more than)
- ☐ Market weight of a calf is 1100 pounds. If a calf weighs 60 pounds at birth how many more pounds does it need to gain to reach market weight? ($1100 - 60 = 1040$ pounds)
- ☐ A bushel of corn weighs 56 pounds. If it takes 60 bushels to feed a calf to reach market weight, how many pounds of corn is this? ($56 \times 60 = 3360$ pounds)

9 Dairy Animals

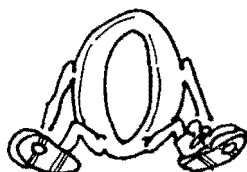
In the United States, cows are the main source of milk, although goats are also raised for milk. Some people cannot digest cow's milk, but can digest goat's milk with no problems. One way in which goat's milk differs from cow's milk is it contains smaller drops of butterfat; it is naturally homogenized.



- ☐ A dairy cow may produce 72 glasses of milk per day. Is that more or less than the number of students in your class?
- ☐ A cow produces 4.5 gallons of milk per day. How many quarts does this equal? ($[4 \times 4] + 2 = 18$ quarts)

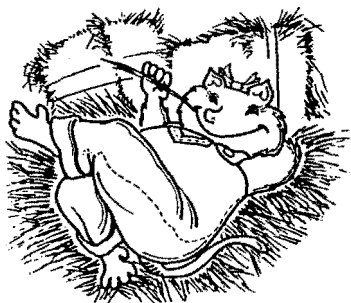


A dairy farmer measures milk in pounds instead of gallons. One gallon of milk weighs 8.6 pounds. An average cow produces 4.5 gallons per day. How many pounds of milk does a cow produce per day? ($8.6 \times 4.5 = 38.7$ pounds)



10 Hay and Straw

Hay is usually made from alfalfa, clover, timothy or orchard grass. It is green in color and is eaten when grass is not available. Straw is usually made from the stems of wheat or oats. It is golden yellow in color and is used as bedding for animals in the barn.



Count the bales of hay in this small stack. How many bales will be left after three days if one bale is eaten per day? ($5 - 3 = 2$ bales)



Count the bales of hay in the small stack. This is the amount 2 cows eat in one week. If the farmer buys three times as many cows, how much will the cows eat in one week? ($5 \times 3 = 15$ bales)



Measure a bale of straw. What is the volume? Use the measurements of the hay mow to determine if 400 bales of straw and 400 bales of hay will fit in the mow. (volume = length \times width \times height; multiply by 800; compare with volume of mow)

11 Farm Fishing

Fish have enormous importance to human beings. They provide for millions of people and are among the most nutritious of all foods. In addition, fish play an important role in the balance of nature serving as both predator and prey.



- ☐ Fish are active in water that is 65° to 75° . If the water temperature is 68° will the fish be active? (yes)

- ☐ A cane pole should be at least twice the height of the person fishing. Use the measuring scale on the wall to find your height. How long should your pole be? (height $\times 2$)

- ☐ A bass can grow to weigh six pounds in eight years. What is the average weight gain of a bass per year? ($6 \div 8 = .75$ pounds)



12 Wheat and Bread

Wheat is the world's most important grain crop. It is adapted to such a wide variety of soil and climatic conditions that it is being planted and harvested somewhere in the world each month of the year.

- ☐ One bushel of wheat weighs 60 pounds. When it is ground, it provides 42 pounds of flour. What is the difference between the weight of the wheat and the flour? ($60 - 42 = 18$ pounds)

- ☐ A farmer averages 50 bushels of wheat per acre. One bushel of wheat will make about 50 loaves of bread. How many loaves of bread can be made from one acre of wheat? ($50 \times 50 = 2500$ loaves)



13 Chickens and Eggs

There are probably more chickens than any other single kind of bird. Chickens are found all over the world, and are raised for both meat and eggs. A hen must sit on fertilized eggs for 21 days before the eggs hatch.



- ☐ How many eggs must a hen lay to fill a container with one dozen eggs? (12 eggs)
- ☐ A hen lays one egg per day. If a farmer had 10 hens, how many eggs would they lay in one week? ($10 \times 7 = 70$ eggs)
- ☐ A hen lays one egg per day. How many dozen eggs will a hen lay in 240 days? ($240 \div 12 = 20$ dozen)



14 Honeybees

Honeybees live in hives which are filled with a honeycomb made by the bees. The honeycomb is used to raise young bees and store food. Bees develop from an egg laid in the honeycomb by the queen. The egg hatches into a small white worm (larva) which is fed and cared for until it goes into a resting stage (pupa) and transforms into an adult honeybee.



- ☐ Count how many frames are in the beehive.
- ☐ A colony of bees eats about 80 pounds of honey during the winter. If the bees produce 155 pounds of honey, how much could be taken and still leave the bees enough to get through the winter? ($155 - 80 = 75$ pounds)
- ☐ A worker bee may make 10,000 visits to a larva to feed and care for it over a six-day period. How many visits is this daily? ($10,000 \div 6 \approx 1667$ visits)

15 Clothing and Textiles

Cotton is the most important fiber used to make clothing. It can be woven into fabric that has strength and durability or it can be spun into fine cloth. Cotton is made into more kinds of products than any other fiber.



- ☐ If $\frac{1}{2}$ of every bale of cotton is used for industrial use and the rest is used to make clothing, how much of the bale is used to make clothing? ($\frac{1}{2}$ of the bale)
- ☐ A wrapped bale of cotton weighs 500 pounds. If the wrapping material weighs 22 pounds, how much does the cotton itself weight? ($500 - 22 = 478$ pounds)
- ☐ About how many 75-pound children will equal the weight of one 500-pound bale of cotton? ($500 \div 75 \approx 6.66$ or 7 children)



MATH IS LIKE . . .

According to students in Dave Kullman's "Mathematics for Elementary Teachers" class, MATH IS LIKE . . .

- A puzzle — it's a challenge, but there's always a correct solution. (Lots of people said this.)
- A jigsaw puzzle — the pieces begin to fit together.
- A maze — at first you're lost, but you can find your way out.
- A rainbow — you can never reach the end; sometimes it's clear and sometimes faint.
- A stray cat — it keeps coming back to your doorstep.
- A child your age whose parents are friends of your parents.
- A peanut butter and banana sandwich (not to everyone's taste).
- Baseball — some people are naturally better at it than others.
- A roller coaster.
- Cooking pudding — you have to pay attention and do it just right.
- Being a farmer — you have to work hard and sometimes you fail.
- Pulling your own teeth without pliers.
- Another language.
- An endless hole — you keep digging, but you're never finished.